**I. Overview**

 A. Brief Summary and Project Period

FOCI/EMA Spring Ichthyoplankton/Larval groundfish survey in the eastern Bering Sea,

May 13 - June 1, 2018.

 B. Days at Sea (DAS)

Of the 20 DAS scheduled for this project, 20 DAS are funded by a Line Office Allocation. This project is estimated to exhibit a High Operational Tempo.

 C. Operating Area - eastern Bering Sea

 

 D. Summary of Objectives

 The primary objective is to conduct an assessment of eggs and larvae of Walleye Pollock

 (*Gadus chalcogrammus*) over the eastern Bering Sea shelf. We will also examine the

interactions among climate, weather, and ichthyoplankton distribution and abundance. This work is needed to describe larval fish assemblages and determine how physical and

 biological factors affect the transport and survival of fish larvae.

 E. Participating Institutions

NOAA – Alaska Fisheries Science Center (AFSC)

7600 Sand Point Way N.E., Seattle, Washington 98115-0070

NOAA – Alaska Fisheries Science Center (AFSC)

TSMRI

17109 Point Lena Loop Road, Juneau, AK, 99801

 F. Personnel/Science Party: name, title, gender, affiliation, and nationality

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| --- | --- | --- | --- | --- | --- | --- |
| **Name (Last, First)** | **Title** | **Date Aboard**  | **Date Disembark** | **Gender** | **Affiliation** | **Nationality** |
| Porter, Steven | Chief Sci. | May 11 | June 2 | M | AFSC/FOCI | USA |
| Deary, Alison | Scientist | May 11 | June 2 | F | AFSC/FOCI | USA |
| Gann, Jeanette | Scientist | May 11 | June 2 | F | AFSC/EMA | USA |
| Lamb, Jesse | Scientist | May 11 | June 2 | M | AFSC/FOCI | USA |
| Paquin, Melanie | Scientist | May 11 | June 2 | F | AFSC/FOCI | USA |

 G. Administrative

1. Points of Contact:

Steven Porter (Chief Scientist)

NOAA – Fisheries, Alaska Fisheries Science Center

7600 Sand Point Way NE

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Seattle WA 98115

Ph: 206-526-6465, Janet.Duffy-Anderson@noaa.gov

Ed Farley, EMA Supervisor

TSMRI / 17109 Point Lena Loop Road

Juneau, AK, 99801

Ph: 907-789-6085, Ed.Farley@noaa.gov

Operations Officer *Oscar Dyson*, Aras Zygas

Ph: (VOIP) 541-867-8911, ops.oscar.dyson@noaa.gov

 2. Diplomatic Clearances

None Required.

 3. Licenses and Permits

This project will be conducted under Scientific Research Permit 2018-B1 issued by the U.S. on December 29, 2017 effective February 1 – October 1, 2018 to AFSC research personnel and NOAA Ship *Oscar Dyson.* In addition, the State of Alaska Fish Resource Permit CF-16-010(1) has been granted and is effective January 1, 2016 to December 31, 2018.

**II. Operations**

The Chief Scientist is responsible for ensuring the scientific staff are trained in planned operations and are knowledgeable of project objectives and priorities. The Commanding Officer is responsible for ensuring all operations conform to the ship’s accepted practices and procedures.

 A. Project Itinerary:

 Departure: May 13, 2018 Dutch Harbor, AK

 Arrival: June 1, 2018 Dutch Harbor, AK

 B. Staging and Destaging:

The equipment necessary for the project will have already been loaded aboard *Oscar Dyson* on the prior FOCI Moorings Project. However additional gear may be loaded prior to the beginning of this project, and we request ship’s assistance with loading on May 11 and 12, 2018, including use of the ship’s crane and a crane operator. We will require dedicated use of the chemistry, hydrographic, wet, dry, and fish processing labs for sample and equipment preparation and request as much counter and cabinet space as possible. We will use the Dry lab for FASTCAT operations. Samples and equipment will be offloaded on June 1 and also possibly on June 2, 2018 in Dutch Harbor, AK, and we request ship’s assistance with this operation, including use of the ship’s crane and a crane operator.

 C. Operations to be Conducted: Operations for this survey will be conducted 24/7.

1. Underway Operations

The ship's Scientific Computer System (SCS) shall operate throughout the project, acquiring and logging data from navigation, meteorological, and oceanographic sensors. See FOCI Standard Operating Instructions (SOI 5.2 and SOI 5.3) for specific requirements. We request that the centerboard be LOWERED for the duration of the project.

1. Station Operations

*Please advise the science party if 2 survey technicians will not be available for the survey.*

*Spring ichthyoplankton survey*: The project will begin upon departure from Dutch Harbor, AK on 13 May 2018. Sampling will occur at pre-determined stations in a grid array encompassing the Unimak Island and Alaska Peninsula vicinity and potentially covering the area as far north as Zhemchug Canyon (see Operating Area – eastern Bering Sea, Appendix 1). All stations of the core sampling grid have priority to be occupied, and selected stations outside of the core grid (adaptive sampling stations) may be occupied to determine the spatial extent of Walleye Pollock larvae distribution (time and ice permitting; see Operating Area – eastern Bering Sea, Appendix 1). At each grid location plankton samples will be taken using 20/60-cm diameter bongo array equipped with a FASTCAT data recorder (temperature, salinity, depth), and CDT, CalVET, or Neuston operations may be conducted there as well.

CTD

A CTD cast (SOI 3.2.1) with Niskin bottles will be conducted at as many as 15 locations during the survey. The first cast will occur at the first station and will be conducted throughout the survey (see Operating Area – eastern Bering Sea, Appendix 1). CTD will be the first operation at the chosen locations, and the survey department will be given 24 hours notice when this operation will take place. These casts are for verifying FASTCAT performance, and to collect phytoplankton samples at discrete depths for Jeanette Gann.

One SCS button is needed to mark:

1) CTD at depth

## At each station, the following should be input into the SCS before button pushes: station number, haul number, and FOCI grid designation. When the “CTD at depth” button is pushed, the following information should be displayed on the SCS screen in the survey office: depth, lat and lon (degrees and decimal minutes), wire out, date, time (GMT).

Bongo

The 20/60-cm bongo net (SOI 3.2.2) will be deployed at every station to a depth of 300 meters, or 10 meters off the bottom, whichever is shallowest. 60-cm net mesh will be 0.505 mm for both nets, and 0.153 mm for both 20-cm bongo nets. The sample collected in Net 1 of the 60-cm bongo will be used to quantify ichthyoplankton and invertebrate zooplankton population density; it will be preserved in a 1.8% formaldehyde-seawater solution buffered with sodium borate (2%). The sample collected in Net 2 will be used to estimate Walleye Pollock larvae density and sorted for larval fish taxa of interest. Special interest taxa will be preserved in 100% EtOH in scintillation vials. Walleye Pollock larvae for condition analysis will also be taken from that net and frozen at -80°C. A subsample of zooplankton taken from that net will also be used to quantify real-time zooplankton abundance. The sample collected in Net 1 of the 20-cm bongo will be used to quantify invertebrate zooplankton population density; it will be preserved in a 1.8% formaldehyde-seawater solution buffered with sodium borate (2%). Net 2 will be used as a back-up to Net 1, and a subsample taken from it will also be used to quantify real-time zooplankton abundance. A FASTCAT profiler (with FASTCAT profiler as back-up as per Section III Equipment) will be used to position the net in real time and to obtain profiles of water temperature and salinity. Three SCS buttons are needed to mark:

1. Bongo at surface (deploy)
2. Bongo at depth
3. Bongo at surface (retrieve)

At each station, the following should be input into the SCS before button pushes: station number, haul number, and FOCI grid designation. When the bongo at depth button is pushed, the following information from the time of the “bongo at depth” button push should be displayed on the SCS screen in the survey office: depth, lat and lon (degrees and decimal minutes), wire out, date, time (GMT).

CalVET

## The CalVET net (with 53-micrometer mesh) (SOI 3.2.6) will be deployed at as many as 32 selected stations (see Operating Area – eastern Bering Sea, Appendix 1). To deploy the CalVET net, the bongo array needs to be removed, and the bongo weight attached to a shackle on the FASTCAT. The CalVET needs to be attached above the FASTCAT. Standard tow depth for this operation is 60 m. The CalVET depth should be monitored by the FASTCAT and files should be saved. The net should be lowered and retrieved at a rate of 45 - 60 m/min. The tow should be vertical with the ship maneuvering only to maintain zero wire angle. If wire angle is 10º from zero (vertical) for more than 30 seconds during the tow, performance will be recorded as “questionable”, and the tow may need to be redone. One SCS button is needed to mark:

 1) CalVET at depth

## At each station, the following should be input into the SCS before button pushes: Station number, haul number, and FOCI grid designation. When the “CalVET at depth” button is pushed, the following information should be displayed on the SCS screen in the survey office: depth, lat and lon (degrees and decimal minutes), wire out, date, time (GMT).

 Neuston

As many as 18 Neuston tows will be conducted along the shelf break and other known areas of abundance to acquire sablefish larvae for special studies (see Operating Area – eastern Bering Sea, Appendix 1). The net mesh will be 505 µm and fished at a ship speed of 1.5 to 2.0 knots. The ship will be asked to standby for a rough count of Sablefish larvae to determine if another Neuston tow will be conducted at that station. Each Neuston tow will be conducted for 10 minutes. The first Neuston sample conducted at each station will be a quantitative sample and preserved in 1.8% formaldehyde. The second Neuston sample will be sorted for larvae and preserved in 100% ethanol. A sub-sample of Sablefish larvae will also be taken from that net and frozen at -80°C for condition and bioenergetics analyses.

 D. Dive Plan

All dives are to be conducted in accordance with the requirements and regulations of the NOAA Diving Program (<http://www.ndc.noaa.gov/dr.html>) and require the approval of the ship’s Commanding Officer.

Dives are not planned for this project.

E. Applicable Restrictions

Conditions which preclude normal operations: poor weather and equipment failure. Poor weather may be waited out in a sheltered area until operations may be resumed and modifications may be made in the sampling grid. Sheltered areas are of scientific interest; therefore, while waiting out poor weather, the Chief Scientist may request sampling operations to assess local physical conditions, zooplankton, and fish populations. Equipment failure would have to be addressed immediately for the project to continue.

**III. Equipment**

 A. Equipment and Capabilities provided by the ship (itemized)

\* Foreword hydrographic winch with slip rings and 3-conductor cable terminated for CTD,

\* Aft hydrographic winch with slip rings and 3-conductor cable terminated for the SBE 19+ for

net tow operations,

\* Sea-Bird Electronics’ SBE19+ CTD system with stand, each CTD system should include underwater CTD, weights, pinger, and a deck unit for the system,

\* 5 or 10-liter Niskin sampling bottles for use with rosette (10 plus spares)

\* Conductivity and temperature sensor package to provide dual sensors on the CTD (primary),

\* For meteorological observations: 2 anemometers (one R.M. Young system interfaced to the SCS), calibrated air thermometer (wet and dry bulb) and a calibrated barometer and/or barograph,

\* Freezer space for storage of biological samples (blast and storage freezers, -20 °C and -80 °C, turned on and operating)

\* SIMRAD ES-60 and EK-60 echosounders,

\* SIMRAD ME-70 Downward-Facing Multi-Beam Sonar, if available

\* Scientific Computer System (SCS),

\* Minimum of 2 computers with internet and e-mail access,

\* Laboratory with storage space,

\* Sea-water hoses and nozzles to wash nets on hero deck and in the wet lab,

\* Adequate deck lighting for night-time operations,

\* Navigational equipment including GPS and radar,

\* Safety harnesses for working on quarterdeck and fantail,

\* Ship’s crane(s) used for loading/unloading scientific gear.

 B. Equipment and Capabilities provided by the scientists (itemized)

1. Plankton Equipment

* + - * 60 cm bongo frames (2)
			* 20 cm bongo frames (2)
			* 60 cm bongo nets and cod-ends
			* 20 cm bongo nets and cod-ends
			* CalVET net and accessories
			* Neuston frames (2)
			* Neuston nets and cod-ends
			* 50 kg bongo weights (2)
			* Flow meters (14)
			* Wire angle indicators (2)
			* Miscellaneous supplies

3. Oceanographic Equipment (500lbs)

* + - * Biospherical QSP2300 PAR sensor
			* SBE 43 dissolved oxygen sensor (2)
			* Secondary TC sensors for SBE 911+
			* FASTCAT (2)
			* Deck unit for FASTCAT
			* Filter racks and pumps (2)

4. Biological Sampling Equipment (500lbs)

* + - * 5-gal buckets (5)
			* Sieves, jar holder, funnels, squirt bottles
			* 9 cases of 32-oz jars in each of 9 wooden shipping crates
			* Jar closures, and labels
			* Preservative-dispenser equipment
			* Hazardous materials spill kit

5. Computing equipment (50lbs)

* + - * Desktop computers (2)
			* Cruise Operations Database (COD) software
			* Electronic and COD paper forms

**IV. Hazardous Materials**

 A. Policy and Compliance

The Chief Scientist is responsible for complying with FEC 07 Hazardous Materials and Hazardous Waste Management Requirements for Visiting Scientific Parties (or the OMAO procedure that supersedes it). By Federal regulations and NOAA Marine and Aviation Operations policy, the ship may not sail without a complete inventory of all hazardous materials by name and quantity, MSDS, appropriate spill cleanup materials (neutralizing agents, buffers, or absorbents) in amounts adequate to address spills of a size equal to the amount of chemical brought aboard, and chemical safety and spill response procedures. Documentation regarding those requirements will be provided by the Chief of Operations, Marine Operations Center, upon request.

Per OMAO procedure, the scientific party will include with their project instructions and provide to the CO of the respective ship 30 days before departure:

* + - List of chemicals by name with anticipated quantity
		- List of spill response materials, including neutralizing agents, buffers, and absorbents
		- Chemical safety and spill response procedures, such as excerpts of the program’s Chemical Hygiene Plan or SOPs relevant for shipboard laboratories
		- For bulk quantities of chemicals in excess of 50 gallons total or in containers larger than 10 gallons each, notify ship’s Operations Officer regarding quantity, packaging and chemical to verify safe stowage is available as soon as chemical quantities are known.

Upon embarkation and prior to loading hazardous materials aboard the vessel, the scientific party will provide to the CO or their designee:

* An inventory list showing actual amount of hazardous material brought aboard
* An MSDS for each material
* Confirmation that neutralizing agents and spill equipment were brought aboard sufficient to contain and cleanup all of the hazardous material brought aboard by the program
* Confirmation that chemical safety and spill response procedures were brought aboard

Upon departure from the ship, scientific parties will provide the CO or their designee an inventory showing that all chemicals were removed from the vessel. The CO’s designee will maintain a log to track scientific party hazardous materials. MSDS will be made available to the ship’s complement, in compliance with Hazard Communication Laws.

Scientific parties are expected to manage and respond to spills of scientific hazardous materials. Overboard discharge of hazardous materials is not permitted aboard NOAA ships.

B. Inventory

See attached Appendix 2

C. Chemical safety and spill response procedures

See attached Appendix 2

D. Radioactive Materials

No Radioactive Isotopes are planned for this project.

**V. Additional Projects**

 A. Supplementary (“Piggyback”) Projects

 No Supplementary Projects are planned.

 B. NOAA Fleet Ancillary Projects

 No NOAA Fleet Ancillary Projects are planned.

**VI. Disposition of Data and Reports**

Disposition of data gathered aboard NOAA ships will conform to NAO 216-101 *Ocean Data Acquisitions* and NAO 212-15 *Management of Environmental Data and Information.* To guide the implementation of these NAOs, NOAA’s Environmental Data Management Committee (EDMC) provides the *NOAA Data Documentation Procedural Directive* (data documentation) and *NOAA Data Management Planning Procedural Directive* (preparation of Data Management Plans). OMAO is developing procedures and allocating resources to manage OMAO data and Programs are encouraged to do the same for their Project data.

1. Data Classifications: *Under Development*
	1. OMAO Data
	2. Program Data
2. Responsibilities: *Under Development*

**VII. Meetings, Vessel Familiarization, and Project Evaluations**

1. Pre-Project Meeting: The Chief Scientist and Commanding Officer will conduct a meeting of pertinent members of the scientific party and ship’s crew to discuss required equipment, planned operations, concerns, and establish mitigation strategies for all concerns. This meeting shall be conducted before the beginning of the project with sufficient time to allow for preparation of the ship and project personnel. The ship’s Operations Officer usually is delegated to assist the Chief Scientist in arranging this meeting.
2. Vessel Familiarization Meeting: The Commanding Officer is responsible for ensuring scientific personnel are familiarized with applicable sections of the standing orders and vessel protocols, e.g., meals, watches, etiquette, drills, etc. A vessel familiarization meeting shall be conducted in the first 24 hours of the project’s start and is normally presented by the ship’s Operations Officer.
3. Post-Project Meeting: The Commanding Officer is responsible for conducted a meeting no earlier than 24 hrs before or 7 days after the completion of a project to discuss the overall success and shortcomings of the project. Concerns regarding safety, efficiency, and suggestions for future improvements shall be discussed and mitigations for future projects will be documented for future use. This meeting shall be attended by the ship’s officers, applicable crew, the Chief Scientist, and members of the scientific party and is normally arranged by the Operations Officer and Chief Scientist.
4. Project Evaluation Report

Within seven days of the completion of the project, a Customer Satisfaction Survey is to be completed by the Chief Scientist or Principal Investigator, as appropriate. The form is available at [https://sites.google.com/a/noaa.gov/omao-intranet-dev/operations/marine/customer-satisfaction-survey](https://docs.google.com/a/noaa.gov/forms/d/1a5hCCkgIwaSII4DmrHPudAehQ9HqhRqY3J_FXqbJp9g/viewform) and provides a “Submit” button at the end of the form. It is also located at <https://docs.google.com/a/noaa.gov/forms/d/1a5hCCkgIwaSII4DmrHPudAehQ9HqhRqY3J_FXqbJp9g/viewform>. Submitted form data is deposited into a spreadsheet used by OMAO management to analyze the information. Though the complete form is not shared with the ships, specific concerns and praises are followed up on while not divulging the identity of the evaluator.

**VIII. Miscellaneous**

 A. Meals and Berthing

The ship will provide meals for the scientists listed above. Meals will be served 3 times daily beginning one hour before scheduled departure, extending throughout the project, and ending two hours after the termination of the project. Since the watch schedule is split between day and night, the night watch may often miss daytime meals and will require adequate food and beverages (for example a variety of sandwich items, cheeses, fruit, milk, juices) during what are not typically meal hours. Special dietary requirements for scientific participants will be made available to the ship’s command at least seven days prior to the project.

Berthing requirements, including number and gender of the scientific party, will be provided to the ship by the Chief Scientist. The Chief Scientist and Commanding Officer will work together on a detailed berthing plan to accommodate the gender mix of the scientific party taking into consideration the current makeup of the ship’s complement. The Chief Scientist is responsible for ensuring the scientific berthing spaces are left in the condition in which they were received; for stripping bedding and linen return; and for the return of any room keys which were issued. Unless prior arrangements are made, the science party may move aboard the night before scheduled departure and must move off the ship the day after scheduled arrival (at the end of project). The Chief Scientist/Principal Investigator is also responsible for the cleanliness of the laboratory spaces and the storage areas utilized by the scientific party, both during the project and at its conclusion prior to departing the ship.

All NOAA scientists will have proper travel orders when assigned to any NOAA ship. The Chief Scientist will ensure that all non NOAA or non Federal scientists aboard also have proper orders. It is the responsibility of the Chief Scientist or Principal Investigator to ensure that the entire scientific party has a mechanism in place to provide lodging and food and to be reimbursed for these costs in the event that the ship becomes uninhabitable and/or the galley is closed during any part of the scheduled project.

All persons boarding NOAA vessels give implied consent to comply with all safety and security policies and regulations which are administered by the Commanding Officer. All spaces and equipment on the vessel are subject to inspection or search at any time. All personnel must comply with OMAO's Drug and Alcohol Policy dated May 17, 2000 which forbids the possession and/or use of illegal drugs and alcohol aboard NOAA Vessels.

 B. Medical Forms and Emergency Contacts

The NOAA Health Services Questionnaire (NHSQ, NF 57-10-01 (3-14)) must be completed in advance by each participating scientist. The NHSQ can be obtained from the Chief Scientist or the NOAA website <http://www.corporateservices.noaa.gov/noaaforms/eforms/nf57-10-01.pdf>.

NHSQs must be submitted every 2 years for individuals under the age of 50 and every 1 year for ages 50 and above. NHSQs must be accompanied by [NOAA Form (NF) 57-10-02](http://www.corporateservices.noaa.gov/~noaaforms/eforms/nf57-10-02.pdf) - Tuberculosis Screening Document in compliance with [OMAO Policy 1008](http://www.omao.noaa.gov/find/media/documents/omao-1008-tuberculosis-protection-program) (Tuberculosis Protection Program, which requires a yearly PPD or TB exam).

The completed forms should be sent to the Marine Health Services at the applicable Marine Operations Center. The NHSQ and Tuberculosis Screening Document should reach the Health Services Office no later than 4 weeks prior to the start of the project to allow time for the participant to obtain and submit additional information should health services require it, before clearance to sail can be granted. Please contact MOC Health Services with any questions regarding eligibility or completion of either form. Ensure to fully complete each form and indicate the ship or ships the participant will be sailing on. The participant will receive an email notice when medically cleared to sail if a legible email address is provided on the NHSQ.

The participant can mail, fax, or email the forms to the contact information below. Participants should take precautions to protect their Personally Identifiable Information (PII) and medical information and ensure all correspondence adheres to DOC guidance (<http://ocio.os.doc.gov/ITPolicyandPrograms/IT_Privacy/PROD01_008240>).

The only secure submission process approved by NOAA is [Accellion Secure File Transfer](https://sft2.doc.gov/courier/web/1000%40/wmLogin.html) which requires the sender to set up an account using a valid NOAA email address and password. [Accellion’s Web Users Guide](https://sft2.doc.gov/courier/1000%40/Accellion_Secure_Collaboration_Guide.pdf) is a valuable aid in using this service. As a cost-reduction measure under the DOC contract with Accellion, user accounts expire after 30 days of inactivity. Simply re-register to send and receive files.

Persons without a NOAA email account must fax or mail their forms.

Contact information:

Marine Health Services

Marine Operations Center – Pacific

2002 SE Marine Science Dr.

Newport, OR 97365

Telephone 541-867-8822

Fax 541-867-8856

Email MOP.Health-Services@noaa.gov

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Prior to departure, the Chief Scientist must provide an electronic listing of emergency contacts to the Executive Officer for all members of the scientific party, with the following information: contact name, address, relationship to member, and telephone number.

 C. Shipboard Safety

Hard hats are required when working with suspended loads.  Work vests are required when working near open railings and during small boat launch and recovery operations.  Hard hats and work vests will be provided by the ship when required.

Wearing open-toed footwear or shoes that do not completely enclose the foot (such as sandals or clogs) outside of private berthing areas is not permitted.  At the discretion of the ship CO, safety shoes (i.e. steel or composite toe protection) may be required to participate in any work dealing with suspended loads, including CTD deployment and recovery.  The ship does not provide safety-toed shoes/boots.  The ship’s Operations Officer should be consulted by the Chief Scientist to ensure members of the scientific party report aboard with the proper attire.

 D. Communications

A progress report on operations prepared by the Chief Scientist may be relayed to the program office. Sometimes it is necessary for the Chief Scientist to communicate with another vessel, aircraft, or shore facility. Through various means of communications, the ship can usually accommodate the Chief Scientist. Special radio voice communications requirements should be listed in the project instructions. The ship’s primary means of communication with the Marine Operations Center is via email and the Very Small Aperture Terminal (VSAT) link. Standard VSAT bandwidth has increased, on average per ship, to 768 kbs and is shared by all vessel’s staff and the science team at no charge to sailing personnel. Increased bandwidth in 7 day increments is available on the VSAT systems at increased cost to the scientific party. If increased bandwidth is being considered, program accounting is required and it must be arranged through the ship’s Commanding Officer at least 30 days in advance.

 E. IT Security

Any computer that will be hooked into the ship's network must comply with the *OMAO Fleet IT Security Policy* 1.1 (November 4, 2005) prior to establishing a direct connection to the NOAA WAN. Requirements include, but are not limited to:

(1) Installation of the latest virus definition (.DAT) file on all systems and performance of a virus scan on each system.
(2) Installation of the latest critical operating system security patches.
(3) No external public Internet Service Provider (ISP) connections.

Completion of the above requirements prior to boarding the ship is required.

Computer Operating Systems that the support vendor has identified as reaching “End of Life” for support will not be allowed on the shipboard network. Examples include Microsoft Windows XP and Vista as well as Windows Server 2003.

Non-NOAA personnel using the ship's computers or connecting their own computers to the ship's network must complete NOAA’s IT Security Awareness Course within 3 days of embarking.

 F. Foreign National Guests Access to OMAO Facilities and Platforms

Foreign National access to the NOAA ship or Federal Facilities is not required for this project.

G. Protected Species and Environmental Compliance

**Summary of mitigation measures for compliance of MMPA and NEPA**

These mitigation measures shall include but are not limited to:

* AFSC shall take all necessary measures to coordinate and communicate in advance of each specific survey with the National Oceanic and Atmospheric Administration’s (NOAA) Office of Marine and Aviation Operations (OMAO) or other relevant parties on non-NOAA platforms to ensure that all mitigation measures and monitoring requirements described herein, as well as the specific manner of implementation and relevant event-contingent decision-making processes, are clearly understood and agreed upon.
* AFSC shall coordinate and conduct briefings at the outset of each survey and as necessary between ship’s crew (Commanding Officer/master or designee(s), as appropriate) and scientific party in order to explain responsibilities, communication procedures, marine mammal monitoring protocol, and operational procedures.
* AFSC shall coordinate as necessary on a daily basis during survey cruises with OMAO personnel or other relevant personnel on non-NOAA platforms to ensure that requirements, procedures, and decision-making processes are understood and properly implemented.
* When deploying any type of sampling gear at sea, AFSC shall at all times monitor for any unusual circumstances that may arise at a sampling site and use best professional judgment to avoid any potential risks to marine mammals during use of all research equipment. AFSC shall convey this requirement to IPHC.
* AFSC shall implement handling and/or disentanglement protocols as specified in the guidance that shall be provided to AFSC survey personnel.
* AFSC shall adhere to a final Communication Plan. In summary and in accordance with the Plan, AFSC shall: (i) notify and provide potentially affected Alaska Native subsistence communities with the Communication Plan through a series of mailings, direct contacts, and planned meetings throughout the regions where AFSC fisheries research is expected to occur;
	+ meet with potentially affected subsistence communities to discuss planned activities and to resolve potential conflicts regarding any aspects of either the fisheries research operations or the Communication Plan;
	+ develop field operations plans as necessary, which shall address how researchers will consult and maintain communication with contacts in the potentially affected subsistence communities when in the field, including a list of local contacts and contact mechanisms, and which shall describe operational procedures and actions planned to avoid or minimize the risk of interactions between AFSC fisheries research and local subsistence activities;
	+ schedule post-season informational sessions with subsistence contacts from the study areas to brief them on the outcome of the AFSC fisheries research and to assess performance of the Communication Plan and individual field operations or cruise plans in working to minimize effects to subsistence activities; and

**Trawl survey protocols:**

* AFSC shall conduct trawl operations as soon as is practicable upon arrival at the sampling station.
* AFSC shall initiate marine mammal watches (visual observation) at least 15 minutes prior to beginning of net deployment, but shall also conduct monitoring during any pre-set activities including trackline reconnaissance, CTD casts, and plankton or bongo net hauls. Marine mammal watches shall be conducted by scanning the surrounding waters with the naked eye and range-finding binoculars (or monocular). During nighttime operations, visual observation shall be conducted using the naked eye and available vessel lighting.
* AFSC shall implement the move-on rule mitigation protocol, as described in this paragraph. If one or more marine mammals are observed and are considered at risk of interacting with the vessel or research gear, or appear to be approaching the vessel and are considered at risk of interaction, AFSC shall either remain onsite or move on to another sampling location. If remaining onsite, the set shall be delayed. If the animals depart or appear to no longer be at risk of interacting with the vessel or gear, a further observation period shall be conducted. If no further observations are made or the animals still do not appear to be at risk of interaction, then the set may be made. If the vessel is moved to a different section of the sampling area, the move-on rule mitigation protocol would begin anew. If, after moving on, marine mammals remain at risk of interaction, the AFSC shall move again or skip the station. Marine mammals that are sighted shall be monitored to determine their position and movement in relation to the vessel to determine whether the move-on rule mitigation protocol should be implemented. AFSC may use best professional judgment in making these decisions.
* AFSC shall maintain visual monitoring effort during the entire period of time that trawl gear is in the water (i.e., throughout gear deployment, fishing, and retrieval). If marine mammals are sighted before the gear is fully removed from the water, AFSC shall take the most appropriate action to avoid marine mammal interaction. AFSC may use best professional judgment in making this decision.
* If trawling operations have been suspended because of the presence of marine mammals, AFSC may resume trawl operations when practicable only when the animals are believed to have departed the area. AFSC may use best professional judgment in making this determination.
* AFSC shall implement standard survey protocols to minimize potential for marine mammal interactions, including maximum tow durations at target depth and maximum tow distance, and shall carefully empty the trawl as quickly as possible upon retrieval.

Within 24 hours of any incidental take of, or injuries or mortalities to, marine mammals as a result of operations, the Chief Scientist/Field Party Chief shall report incident to the vessel CO, Jon Kurland (jon.kurland@noaa.gov, 907-586-7638) or Robyn Angliss (robyn.angliss@noaa.gov, 206-526-4032), and Jeff Napp (jeff.napp@noaa.gov; 206-526-4148). This information will be entered into the Protected Species Incidental Take (PSIT) system per instructions below.

Seabirds can be sampled and retained for salvage – if take involves seabird, include Shannon Fitzgerald in notification at shannon.fitzgerald@noaa.gov. If take involves ESA-listed bird, retain specimen and we will notify FWS (to issue collection authority). Do not retain gulls – except Kittiwakes. Albatross are high priority.

KEY ACTIONS IN RESPONSE TO ALL INCIDENTAL TAKES

1. Prior to the project, communicate and coordinate with vessel crew about established protected species incidental take reporting and handling procedures whether NOAA, charter, or partner project. Ensure regional ESA biologists and pertinent staff are in the PSIT email alert notification list. The Office of Law Enforcement (OLE) will be notified of takes via PSIT email alert system for all non-marine mammal takes including seabirds within 48 hours of the event.
2. Immediately notify bridge if incidental takes occur.
3. Notify the geographically-appropriate Regional Stranding Response Coordinator (numbers in this document) immediately following the incidental take of a marine mammal. Stranding Response Coordinator will contact Office of Law Enforcement (OLE). For live injured/uninjured marine mammals, priority should be to release the animal before notifying stranding response networks. NOTE: If Coordinators are unreachable, collect pertinent PSIT information and release animal and/or retain carcass if logistically feasible.
4. For a sea turtle or protected fish (injured/live/dead), follow the Terms and Conditions stated in your Fisheries Independent Monitoring Biological Opinion regarding reporting and data collection. If you do not have a current Biological Opinion, contact your designated Regional or Science Center Protected Species Point of Contact for instructions.
5. For handling, sampling and salvaging seabirds (ESA and non-ESA listed), contact regional United States Fish and Wildlife Service (USFWS) points of contact or NMFS regional seabird coordinator. If you have a permit, report seabird takes to PSIT.

PRE-PROJECT ACTIONS

1. Prior to the project, communicate and coordinate with vessel crew about established protected species incidental take reporting and handling procedures whether NOAA, charter, or partner project.
2. Ensure regional ESA biologists and pertinent protected resources staff is in the PSIT email alert notification list.
3. The NMFS Chief Scientist or Designee shall contact the appropriate Regional Stranding Network and query about additional numbers or specific contacts to reach in case of an incidental take of a marine mammal.

WHAT TO DO WITH LIVE, INJURED OR UNINJURED MARINE MAMMAL

If a live, injured or uninjured marine mammal is incidentally captured, the animal should be released immediately.

1. Considering human safety, work from the vessel as quickly and carefully as possible to free the animal from the gear. Ensure the animal can continue to breathe while freeing from the gear.
2. If it can be done immediately without further harming the animal, photograph the animal (dorsal and ventral sides including dorsal fin, flanks, head/jaw) and gear interaction at time of capture and when free from gear prior to release and collect required PSIT information.
3. If animal is NOT brought aboard the vessel and taking photos is not an option, provide a comprehensive summary of the incident following requirements described under ‘PSIT narrative’ in this document.
4. Notify Regional Stranding Response Coordinator about the incident.
5. Submit take information for submission to PSIT and attach any forms, photos, and narrative to the take record within a week of the event.

Note: Untrained personnel should not attempt to handle live injured/uninjured marine mammals or disentangle large whales. In the event of a large entangled whale, immediately call your regional entanglement response network.

WHAT TO DO WITH DEAD MARINE MAMMAL OR SEA TURTLE?

* 1. Notify Regional Stranding Network Coordinator about the take of a dead marine mammal.
	2. For sea turtle takes, simply report the take/s to PSIT and follow the instructions listed in your Biological Opinion or follow Regional or Science Center Protected Species Point of Contact instructions.
	3. Release animal after necessary information is collected as described below.
	4. Photos of the carcass should be taken: Dorsal fin, ventral side, and flank for marine mammals, as well as signs of entanglement, scars, and injuries. This also includes collecting required PSIT data.
	5. Submit take information for submission to PSIT and attach any forms, photos, and narrative to the take record.

PSIT Reporting

Report [1] Species involved, [2] number dead, number injured and released, or number uninjured and released, [3] date and time, [4] latitude and longitude, [5] any mitigation measures taken, [6] other comments or observations germane to this take. Note if photo was taken.

In addition to the required PSIT information please complete a narrative which includes the following information.

1. Animal Condition (include photos)

Code 1 – Live Animal

Code 2 – Fresh Dead

Code 3 – Moderate Decomposition

Code 4 – Advanced Decomposition

1. Mention if animal escaped or was released.
2. Indicate if the animal or other marine mammals or sea turtles were seen in the vicinity of the vessel during fisheries operations.
3. Animal condition post-release: Describe any observed injuries, the condition and behavioral state of released or injured animal (e.g., no obvious injuries and animal swam away vigorously, did not swim away vigorously, animal surfaced to breathe, animal sank to bottom, or blood in water observed).
4. If gear was still attached to animal after release, describe how the gear was cut and approximately how much gear is left and where it is still entangled/injured.
5. Photos: Provide comprehensive photographic evidence or written description of live/dead or injured animal. Provide pictures (if possible) of how the animal was entangled in the gear, and any gear-related interactions such as wounds or constrictions.
6. Decision-making: Include rationale for any discretionary decisions taken by Chief Scientist/crew.
7. Describe possible causes for incidental capture of the animal and any additional mitigation measures that were taken, or might be taken to prevent similar captures in all subsequent operations.

ENTANGLEMENT RESPONSE NETWORK NUMBER

Alaska Region: 1-877-925-7773

**IX. Appendices**

 1. Station/Waypoint List (coordinates in Latitude, Longitude: degree-minutes). Stations listed in order of occupation and number of stations occupied may vary.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Latitude**  | **Latitude**  | **Longitude**  | **Longitude**  |  |
| **ID** | **deg. (N)** | **min. (N)** | **deg. (W)** | **min. (W)** | **Operation** |
| BD1 | 54 | 22.144 | 165 | 26.844 | Bongo, CTD, Neuston |
| BD7 | 54 | 48.522 | 165 | 51.564 | Bongo, Neuston |
| BA4 | 54 | 42.494 | 165 | 16.218 | Bongo |
| AX7 | 55 | 2.844 | 165 | 5.658 | Bongo, CalVET, Neuston |
| AU4 | 54 | 56.816 | 164 | 30.096 | Bongo |
| AR7 | 55 | 17.166 | 164 | 19.476 | Bongo, Neuston |
| AO4 | 55 | 11.138 | 163 | 43.704 | Bongo, CTD |
| AL7 | 55 | 31.488 | 163 | 33.018 | Bongo, CalVET |
| AI4 | 55 | 25.460 | 162 | 57.024 | Bongo |
| AF7 | 55 | 45.810 | 162 | 46.272 | Bongo |
| Z7 | 56 | 0.132 | 161 | 59.244 | Bongo, CTD, CalVET |
| T7 | 56 | 14.455 | 161 | 11.922 | Bongo |
| Q4 | 56 | 8.426 | 160 | 35.262 | Bongo |
| N7 | 56 | 28.777 | 160 | 24.306 | Bongo, CalVET |
| H7 | 56 | 43.164 | 159 | 37.533 | Bongo |
| ZY10 | 57 | 17.801 | 158 | 37.792 | Bongo |
| E10 | 57 | 3.525 | 159 | 25.091 | Bongo |
| B13 | 57 | 23.924 | 159 | 15.621 | Bongo |
| ZY16 | 57 | 44.369 | 159 | 4.141 | Bongo |
| ZY22 | 58 | 11.974 | 159 | 31.933 | Bongo |
| B19 | 57 | 51.476 | 159 | 43.173 | Bongo, CalVET |
| E16 | 57 | 29.626 | 159 | 51.000 | Bongo |
| H13 | 57 | 9.282 | 160 | 3.849 | Bongo |
| K10 | 56 | 49.127 | 160 | 13.428 | Bongo |
| Q10 | 56 | 34.804 | 161 | 1.116 | Bongo |
| N13 | 56 | 55.154 | 160 | 50.394 | Bongo |
| K16 | 57 | 15.505 | 160 | 39.756 | Bongo |
| H19 | 57 | 36.408 | 160 | 30.975 | Bongo |
| E22 | 57 | 56.984 | 160 | 20.296 | Bongo |
| H25 | 58 | 2.679 | 160 | 57.271 | Bongo |
| K22 | 57 | 41.883 | 161 | 6.396 | Bongo |
| N19 | 57 | 21.533 | 161 | 16.788 | Bongo, CalVET |
| Q16 | 57 | 1.183 | 161 | 27.270 | Bongo |
| T13 | 56 | 40.832 | 161 | 37.842 | Bongo |
| W10 | 56 | 20.482 | 161 | 48.504 | Bongo |
| AC10 | 56 | 6.160 | 162 | 35.598 | Bongo |
| Z13 | 56 | 26.510 | 162 | 25.002 | Bongo |
| W16 | 56 | 46.861 | 162 | 14.496 | Bongo |
| T19 | 57 | 7.211 | 162 | 4.068 | Bongo |
| Q22 | 57 | 27.561 | 161 | 53.742 | Bongo |
| N25 | 57 | 47.911 | 161 | 43.500 | Bongo |
| K28 | 58 | 8.261 | 161 | 33.360 | Bongo |
| N31 | 58 | 14.289 | 162 | 10.542 | Bongo, CalVET |
| Q28 | 57 | 53.939 | 162 | 20.526 | Bongo |
| T25 | 57 | 33.589 | 162 | 30.612 | Bongo |
| W22 | 57 | 13.239 | 162 | 40.794 | Bongo |
| Z19 | 56 | 52.889 | 162 | 51.066 | Bongo, CalVET |
| AC16 | 56 | 32.539 | 163 | 1.428 | Bongo |
| AF13 | 56 | 12.188 | 163 | 11.874 | Bongo |
| AI10 | 55 | 51.838 | 163 | 22.404 | Bongo |
| AO10 | 55 | 37.516 | 164 | 8.928 | Bongo |
| AL13 | 55 | 57.866 | 163 | 58.458 | Bongo |
| AI16 | 56 | 18.217 | 163 | 48.072 | Bongo |
| AF19 | 56 | 38.567 | 163 | 37.770 | Bongo |
| AC22 | 56 | 58.917 | 163 | 27.558 | Bongo |
| Z25 | 57 | 19.267 | 163 | 17.430 | Bongo |
| W28 | 57 | 39.617 | 163 | 7.404 | Bongo |
| T31 | 57 | 59.967 | 162 | 57.474 | Bongo |
| Q34 | 58 | 20.317 | 162 | 47.646 | Bongo |
| N37 | 58 | 40.667 | 162 | 37.920 | Bongo |
| Q40 | 58 | 46.696 | 163 | 15.102 | Bongo |
| T37 | 58 | 26.345 | 163 | 24.666 | Bongo |
| W34 | 58 | 5.995 | 163 | 34.338 | Bongo |
| Z31 | 57 | 45.645 | 163 | 44.118 | Bongo, CalVET |
| AC28 | 57 | 25.295 | 163 | 53.994 | Bongo |
| AF25 | 57 | 4.945 | 164 | 3.972 | Bongo |
| AI22 | 56 | 44.594 | 164 | 14.040 | Bongo, CTD |
| AL19 | 56 | 24.245 | 164 | 24.198 | Bongo, CalVET |
| AO16 | 56 | 3.895 | 164 | 34.440 | Bongo |
| AR13 | 55 | 43.544 | 164 | 44.766 | Bongo |
| AU10 | 55 | 23.194 | 164 | 55.176 | Bongo, Neuston |
| BA10 | 55 | 8.872 | 165 | 41.142 | Bongo, Neuston |
| AX13 | 55 | 29.222 | 165 | 30.798 | Bongo, Neuston |
| AU16 | 55 | 49.573 | 165 | 20.526 | Bongo |
| AR19 | 56 | 9.922 | 165 | 10.344 | Bongo |
| AO22 | 56 | 30.272 | 165 | 0.240 | Bongo |
| AL25 | 56 | 50.623 | 164 | 50.232 | Bongo |
| AI28 | 57 | 10.973 | 164 | 40.308 | Bongo |
| AF31 | 57 | 31.323 | 164 | 30.486 | Bongo |
| AC34 | 57 | 51.673 | 164 | 20.754 | Bongo |
| Z37 | 58 | 12.023 | 164 | 11.130 | Bongo |
| W40 | 58 | 32.373 | 164 | 1.614 | Bongo |
| T43 | 58 | 52.723 | 163 | 52.206 | Bongo |
| Q46 | 59 | 13.073 | 163 | 42.906 | Bongo |
| T49 | 59 | 19.102 | 164 | 20.094 | Bongo |
| W46 | 58 | 58.751 | 164 | 29.226 | Bongo |
| Z43 | 58 | 38.401 | 164 | 38.478 | Bongo, CalVET |
| AC40 | 58 | 18.051 | 164 | 47.844 | Bongo |
| AF37 | 57 | 57.701 | 164 | 57.318 | Bongo |
| AI34 | 57 | 37.351 | 165 | 6.894 | Bongo |
| AL31 | 57 | 17.001 | 165 | 16.572 | Bongo, CalVET |
| AO28 | 56 | 56.651 | 165 | 26.346 | Bongo |
| AR25 | 56 | 36.301 | 165 | 36.210 | Bongo |
| AU22 | 56 | 15.950 | 165 | 46.170 | Bongo |
| AX19 | 55 | 55.600 | 165 | 56.214 | Bongo, CTD, CalVET |
| BA16 | 55 | 35.251 | 166 | 6.342 | Bongo, Neuston |
| BD13 | 55 | 14.900 | 166 | 16.548 | Bongo, Neuston |
| BG10 | 54 | 54.550 | 166 | 26.838 | Bongo, Neuston |
| BJ13 | 55 | 0.578 | 167 | 2.040 | Bongo, CTD, Neuston |
| BG16 | 55 | 20.928 | 166 | 51.888 | Bongo, Neuston |
| BD19 | 55 | 41.278 | 166 | 41.814 | Bongo, Neuston |
| BA22 | 56 | 1.628 | 166 | 31.830 | Bongo |
| AX25 | 56 | 21.979 | 166 | 21.924 | Bongo |
| AU28 | 56 | 42.329 | 166 | 12.108 | Bongo |
| AR31 | 57 | 2.679 | 166 | 2.388 | Bongo |
| AO34 | 57 | 23.029 | 165 | 52.758 | Bongo, CTD |
| AL37 | 57 | 43.379 | 165 | 43.230 | Bongo |
| AI40 | 58 | 3.729 | 165 | 33.804 | Bongo |
| AF43 | 58 | 24.079 | 165 | 24.486 | Bongo |
| AC46 | 58 | 44.429 | 165 | 15.270 | Bongo |
| Z49 | 59 | 4.780 | 165 | 6.174 | Bongo |
| AC52 | 59 | 10.808 | 165 | 43.050 | Bongo |
| AF49 | 58 | 50.458 | 165 | 51.990 | Bongo |
| AI46 | 58 | 30.107 | 166 | 1.044 | Bongo |
| AL43 | 58 | 9.757 | 166 | 10.218 | Bongo, CalVET |
| AO40 | 57 | 49.407 | 166 | 19.488 | Bongo |
| AR37 | 57 | 29.057 | 166 | 28.872 | Bongo |
| AU34 | 57 | 8.707 | 166 | 38.352 | Bongo |
| AX31 | 56 | 48.357 | 166 | 47.934 | Bongo, CalVET |
| BA28 | 56 | 28.007 | 166 | 57.606 | Bongo |
| BD25 | 56 | 7.657 | 167 | 7.368 | Bongo |
| BG22 | 55 | 47.306 | 167 | 17.220 | Bongo |
| BJ19 | 55 | 26.956 | 167 | 27.156 | Bongo, CalVET |
| BM16 | 55 | 6.606 | 167 | 37.170 | Bongo |
| BP19 | 55 | 12.634 | 168 | 12.228 | Bongo |
| BM22 | 55 | 32.984 | 168 | 2.346 | Bongo |
| BJ25 | 55 | 53.335 | 167 | 52.548 | Bongo |
| BG28 | 56 | 13.685 | 167 | 42.840 | Bongo |
| BD31 | 56 | 34.035 | 167 | 33.216 | Bongo, CTD |
| BA34 | 56 | 54.385 | 167 | 23.682 | Bongo |
| AX37 | 57 | 14.735 | 167 | 14.250 | Bongo |
| AU40 | 57 | 35.085 | 167 | 4.914 | Bongo |
| AR43 | 57 | 55.435 | 166 | 55.674 | Bongo |
| AO46 | 58 | 15.785 | 166 | 46.548 | Bongo |
| AL49 | 58 | 36.136 | 166 | 37.536 | Bongo |
| AI52 | 58 | 56.486 | 166 | 28.632 | Bongo |
| AF55 | 59 | 16.835 | 166 | 19.848 | Bongo |
| AC58 | 59 | 37.186 | 166 | 11.184 | Bongo |
| AF61 | 59 | 43.214 | 166 | 48.066 | Bongo |
| AI58 | 59 | 22.864 | 166 | 56.574 | Bongo |
| AL55 | 59 | 2.513 | 167 | 5.202 | Bongo, CalVET |
| AO52 | 58 | 42.163 | 167 | 13.950 | Bongo |
| AR49 | 58 | 21.814 | 167 | 22.812 | Bongo |
| AU46 | 58 | 1.463 | 167 | 31.794 | Bongo |
| AX43 | 57 | 41.113 | 167 | 40.878 | Bongo, CalVET |
| BA40 | 57 | 20.763 | 167 | 50.070 | Bongo |
| BD37 | 57 | 0.413 | 167 | 59.358 | Bongo |
| BG34 | 56 | 40.063 | 168 | 8.748 | Bongo |
| BJ31 | 56 | 19.712 | 168 | 18.234 | Bongo, CalVET |
| BM28 | 55 | 59.363 | 168 | 27.810 | Bongo |
| BP25 | 55 | 39.013 | 168 | 37.470 | Bongo, CTD |
| BS28 | 55 | 45.041 | 169 | 12.522 | Bongo |
| BP31 | 56 | 5.390 | 169 | 3.000 | Bongo, Neuston |
| BM34 | 56 | 25.741 | 168 | 53.562 | Bongo, Neuston |
| BJ37 | 56 | 46.091 | 168 | 44.214 | Bongo |
| BG40 | 57 | 6.441 | 168 | 34.968 | Bongo |
| BD43 | 57 | 26.791 | 168 | 25.818 | Bongo |
| BA46 | 57 | 47.141 | 168 | 16.770 | Bongo |
| AX49 | 58 | 7.492 | 168 | 7.836 | Bongo |
| AU52 | 58 | 27.841 | 167 | 59.004 | Bongo |
| AR55 | 58 | 48.191 | 167 | 50.292 | Bongo |
| AO58 | 59 | 8.542 | 167 | 41.694 | Bongo |
| AL61 | 59 | 28.892 | 167 | 33.222 | Bongo |
| AO64 | 59 | 34.920 | 168 | 9.798 | Bongo |
| AR61 | 59 | 14.570 | 168 | 18.120 | Bongo |
| AU58 | 58 | 54.220 | 168 | 26.562 | Bongo |
| AX55 | 58 | 33.869 | 168 | 35.124 | Bongo, CalVET |
| BA52 | 58 | 13.519 | 168 | 43.806 | Bongo, CTD |
| BD49 | 57 | 53.169 | 168 | 52.596 | Bongo |
| BG46 | 57 | 32.819 | 169 | 1.500 | Bongo |
| BJ43 | 57 | 12.469 | 169 | 10.506 | Bongo, CalVET |
| BM40 | 56 | 52.119 | 169 | 19.614 | Bongo |
| BP37 | 56 | 31.769 | 169 | 28.818 | Bongo, CTD |
| BS34 | 56 | 11.419 | 169 | 38.118 | Bongo, Neuston |
| BY34 | 55 | 57.097 | 170 | 22.422 | Bongo, Neuston |
| BV37 | 56 | 17.447 | 170 | 13.164 | Bongo, Neuston |
| BS40 | 56 | 37.797 | 170 | 4.002 | Bongo |
| BP43 | 56 | 58.147 | 169 | 54.936 | Bongo |
| BM46 | 57 | 18.497 | 169 | 45.972 | Bongo, CTD |
| BJ49 | 57 | 38.847 | 169 | 37.110 | Bongo |
| BG52 | 57 | 59.197 | 169 | 28.350 | Bongo |
| BD55 | 58 | 19.547 | 169 | 19.704 | Bongo |
| BA58 | 58 | 39.898 | 169 | 11.172 | Bongo |
| AX61 | 59 | 0.248 | 169 | 2.760 | Bongo |
| AU64 | 59 | 20.960 | 168 | 54.743 | Bongo |
| BA64 | 59 | 6.276 | 169 | 38.886 | Bongo |
| BD61 | 58 | 45.926 | 169 | 47.154 | Bongo |
| BG58 | 58 | 25.576 | 169 | 55.536 | Bongo |
| BJ55 | 58 | 5.225 | 170 | 4.032 | Bongo, CalVET |
| BM52 | 57 | 44.875 | 170 | 12.648 | Bongo |
| BP49 | 57 | 24.525 | 170 | 21.372 | Bongo |
| BS46 | 57 | 4.175 | 170 | 30.192 | Bongo, CTD |
| BV43 | 56 | 43.825 | 170 | 39.126 | Bongo, CalVET |
| BY40 | 56 | 23.475 | 170 | 48.144 | Bongo |
| CB43 | 56 | 29.503 | 171 | 23.064 | Bongo |
| BY46 | 56 | 49.853 | 171 | 14.172 | Bongo |
| BV49 | 57 | 10.203 | 171 | 5.388 | Bongo |
| BS52 | 57 | 30.553 | 170 | 56.700 | Bongo |
| BP55 | 57 | 50.903 | 170 | 48.120 | Bongo |
| BM58 | 58 | 11.254 | 170 | 39.648 | Bongo |
| BJ61 | 58 | 31.604 | 170 | 31.296 | Bongo, CTD |
| BG64 | 58 | 51.953 | 170 | 23.064 | Bongo |
| BM64 | 58 | 37.631 | 171 | 6.990 | Bongo |
| BP61 | 58 | 17.281 | 171 | 15.198 | Bongo |
| BS58 | 57 | 56.932 | 171 | 23.520 | Bongo |
| BV55 | 57 | 36.581 | 171 | 31.962 | Bongo, CalVET |
| BY52 | 57 | 16.231 | 171 | 40.506 | Bongo |
| CB49 | 56 | 55.881 | 171 | 49.158 | Bongo |
| CE46 | 56 | 35.531 | 171 | 57.912 | Bongo |
| CH49 | 56 | 41.559 | 172 | 32.688 | Bongo |
| CE52 | 57 | 1.909 | 172 | 24.072 | Bongo |
| CB55 | 57 | 22.259 | 172 | 15.558 | Bongo |
| BY58 | 57 | 42.610 | 172 | 7.152 | Bongo, CTD |
| BV61 | 58 | 2.959 | 171 | 58.860 | Bongo |
| BS64 | 58 | 23.309 | 171 | 50.676 | Bongo |
| BY64 | 58 | 8.987 | 172 | 34.128 | Bongo |
| CB61 | 57 | 48.637 | 172 | 42.282 | Bongo |
| CE58 | 57 | 28.287 | 172 | 50.550 | Bongo |
| CH55 | 57 | 7.937 | 172 | 58.926 | Bongo, CalVET |
| CK52 | 56 | 47.587 | 173 | 7.404 | Bongo |
| CN55 | 56 | 53.615 | 173 | 42.054 | Bongo |
| CK58 | 57 | 13.965 | 173 | 33.708 | Bongo |
| CH61 | 57 | 34.315 | 173 | 25.476 | Bongo |
| CE64 | 57 | 54.665 | 173 | 17.346 | Bongo |
| CK64 | 57 | 40.343 | 174 | 0.330 | Bongo |
| CQ64 | 57 | 26.021 | 174 | 43.092 | Bongo |
| CW64 | 57 | 12.264 | 175 | 27.443 | Bongo |
| CZ61 | 56 | 51.155 | 175 | 35.066 | Bongo |
| DC58 | 56 | 31.609 | 175 | 43.471 | Bongo |
| DF55 | 56 | 10.696 | 175 | 51.289 | Bongo, CalVET |
| DC52 | 56 | 5.223 | 175 | 17.280 | Bongo |
| CZ55 | 56 | 24.573 | 175 | 8.289 | Bongo |
| CW58 | 56 | 45.321 | 174 | 59.352 | Bongo |
| CT61 | 57 | 5.671 | 174 | 51.168 | Bongo |
| CN61 | 57 | 19.993 | 174 | 8.436 | Bongo |
| CQ58 | 56 | 59.643 | 174 | 16.644 | Bongo |
| CT55 | 56 | 39.293 | 174 | 24.960 | Bongo, CalVET |
| CW52 | 56 | 18.943 | 174 | 33.378 | Bongo |
| CZ49 | 55 | 58.593 | 174 | 41.892 | Bongo |
| CW46 | 55 | 52.565 | 174 | 7.698 | Bongo |
| CT49 | 56 | 12.915 | 173 | 59.052 | Bongo |
| CQ52 | 56 | 33.265 | 173 | 50.508 | Bongo |
| CN49 | 56 | 27.237 | 173 | 15.990 | Bongo |
| CQ46 | 56 | 6.887 | 173 | 24.666 | Bongo |
| CT43 | 55 | 46.537 | 173 | 33.444 | Bongo, CalVET |
| CQ40 | 55 | 40.508 | 172 | 59.124 | Bongo |
| CN43 | 56 | 0.859 | 172 | 50.220 | Bongo |
| CK46 | 56 | 21.209 | 172 | 41.406 | Bongo |
| CH43 | 56 | 15.181 | 172 | 6.756 | Bongo, CalVET |
| CK40 | 55 | 54.831 | 172 | 15.702 | Bongo |
| CN37 | 55 | 34.481 | 172 | 24.744 | Bongo |
| CK34 | 55 | 28.453 | 171 | 50.292 | Bongo |
| CH37 | 55 | 48.803 | 171 | 41.124 | Bongo |
| CE40 | 56 | 9.153 | 171 | 32.046 | Bongo |
| CB37 | 56 | 3.125 | 170 | 57.264 | Bongo |
| CE34 | 55 | 42.775 | 171 | 6.480 | Bongo |
| CH31 | 55 | 22.424 | 171 | 15.780 | Bongo, CalVET |
| CE28 | 55 | 16.396 | 170 | 41.196 | Bongo |
| CB31 | 55 | 36.746 | 170 | 31.764 | Bongo |
| BV31 | 55 | 51.068 | 169 | 47.508 | Bongo, CalVET |
| BY28 | 55 | 30.718 | 169 | 56.982 | Bongo |
| CB25 | 55 | 10.369 | 170 | 6.546 | Bongo |
| BY22 | 55 | 4.340 | 169 | 31.830 | Bongo |
| BV25 | 55 | 24.691 | 169 | 22.134 | Bongo |
| BS22 | 55 | 18.662 | 168 | 47.214 | Bongo |
| BV19 | 54 | 58.312 | 168 | 57.042 | Bongo, CalVET |
| BS16 | 54 | 52.284 | 168 | 22.188 | Bongo |
| BP13 | 54 | 46.256 | 167 | 47.262 | Bongo |

 2.Hazardous materials sections: Inventory and Chemical safety spill kit contents

 and response procedures

Inventory (itemized) approximated from previous years. Final amounts not available at this time.

*Dyson* will be loaded on a date and time TBD in consultation with ship’s personnel prior to or immediately following gear trials on Jan 19 and 26, 2018, by FOCI and MACE personnel. All chemicals listed will be used for the entire 2018 *Dyson* field season. Chemical volumes will be reported to the Ops Officer, and the designated contact for each survey will be required to report to chemical owners. The name of the group responsible for each of the chemicals is designated after the chemical name in the table. MSDS, chemical hygiene plan, and SOPs will be provided to *Dyson* before the loading of the vessel, and spill response procedures will be located in a binder in the chem lab, next to the door leading into the wet lab.

| **Common Name** | **Concentration** | **Amount** | **Spill Response**  | **Notes** |
| --- | --- | --- | --- | --- |
| DNA AwayProperty of FOCI | 100% | 1 – 250 ml | Gloves Paper towels Plastic bag | Not a regulated chemical. |
| EthanolProperty of FOCI | 100% | 4 -1 gal. plastic jugs | Spill Control: EGloves3M Sorbent Pads Plastic bag | Store in Chem. Lab yellow flammables cabinet. |
| Ethylene GlycolProperty of FOCI | 100% | 1 – 500 ml | Gloves Paper towels Plastic bag | Not a regulated chemical. Store in Spill Kit. |
| FormaldehydeProperty of FOCI | 37% | 8 – 2.5 gal. barrels | GlovesEye Protection Fan-Pads Formalex PolyForm-F Plastic bags | Store in Fish Lab flammable cabinets. Will need to place 4 in each cabinet. |
| Glycerol/Thymol SolutionProperty of MACE | 50 % | 2 – 5 gal., bucket | Gloves Paper towels Kitty litter | Not a regulated chemical/solution. Store in Fish Lab under sink. |
| Manganese ChlorideProperty of PMEL | 3M | 1 liter | Gloves Kitty Litter Plastic bag | Not a regulated chemical/solution. Used for oxygen titrations. |
| Mercuric ChlorideProperty of PMEL | Saturated Solution | 0.25 liter | Spill Control M |  |
| Potassium IodateProperty of PMEL | 0.00167 M | 1 liter | Spill Control: PI GlovesPlastic bag | Used for oxygen titrations. Store in Acid Locker in Chem. Lab. |
| Sodium Borate SolutionProperty of FOCI | 5-6% | 1 – 5 gal. | Gloves Paper towelsPlastic bag | Not a regulated chemical.Working container will be secured on Fish Lab counter. |
| Sodium Borate PowderProperty of FOCI | 100% | 1 – 500 g | GlovesWet paper towels Plastic bag | Not a regulated chemical. Stored in Spill Kit. |
| Sodium Iodide/NaOH SolutionProperty of PMEL | 4 M Nal,8 M NaOH | 1 liter | Spill Control: B | Used for oxygen titrations. Store in Acid Locker in Chem. Lab. |
| Sodium ThiosulfateProperty of PMEL | 0.11 M | 1 liter | Spill Control: ST | Used for oxygen titrations. Store in Acid Locker in Chem. Lab. |
| Sulfuric Acid Property of PMEL | 5 M | 1 liter | Spill Control: A | Used for oxygen titrations. Store in Acid Locker in Chem. Lab. |

Chemical safety and spill response procedures

| **FOCI Spill Kit Contents** | **Amount** | **Use** | **Total Spill Volume Controllable** | **Notes** |
| --- | --- | --- | --- | --- |
| Formalex | 1. – 5 gallon
2. -1 gallon
 | Formaldehyde cleanup (all concentrations) | 1:1 control | Formalex will be used in conjunction with Fan-Pads to reduce spill volume. |
| Fan-Pads | 2 rolls (50 sheets each roll) | Formaldehyde cleanup (all concentrations) | 50 sheets = 50 - 150 ml spills | Formalex will be used in conjunction with Fan-Pads to reduce total spill volume. |
| PolyForm-F | 1 – 5 gal. bucket | Formaldehyde cleanup (all concentrations) | 1:1 control | Pour onto large spill immediately to deactivate formaldehyde. |
| 3 M Pads | 10 pads | Ethanol cleanup | 10 pads=10 - 250ml spills | Pads may be reused if dried out under fume hood. |
| Nitrile Gloves | 8 pairs each S,M,L,XL | For all cleanup procedures | N/A | Gloves will be restocked by each survey group. |
| Eye Protection | 4 pairs goggles1 face shield | Formaldehyde cleanup | N/A | Eye protection will be cleaned before re-use. |
| Tyvex Lab Coats | 2 coats | Formaldehyde cleanup | N/A | Coats will be cleaned with Fan- Pads and Formalex before reuse. |
| Plastic Bags | 2 | Formaldehyde cleanup/Fan Pads | N/A | Bags may be packed full and sealed. |

| **PMEL Acid- Base Spill Kit Contents** | **Amount** | **Use** | **Total Spill Volume Controllable** | **Notes** |
| --- | --- | --- | --- | --- |
| Spilfyter Acid Neutralizer | 1 box | Clean up acid spill—H2SO4 | 1.5l of 5M Sulfuric Acid 5.57l of 10% (1M) HCl |  |
| Spilfyter Base Neutralizer | 1 box | Clean up base spill--NaOH | 2.0l of Sodium Hydroxide |  |
| Vinyl Gloves | 1 box | Protect hands during cleanup | N/A |  |
| Foxtail/Dustpan | 1 each | Pick up absorbed neutralizer | N/A |  |
| Rubber apron | 1 each | Protect during cleanup | N/A |  |
| Paper Towels | 1 roll | Absorb liquids | N/A |  |
| Goggles | 2 pair | Protect eyes | N/A |  |
| Chemical absorbent (kitty litter) | 1 liter | Absorb liquids | 0.5l |  |
| Plastic Bags | 2 each | Contain used absorbents/waste | N/A |  |

SPILL CONTROL

**A: ACID**

* + Wear appropriate protective equipment and clothing during clean-up. Keep upwind. Keep out of low areas.
	+ Ventilate closed spaces before entering them.
	+ Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible.
	+ **Large Spills**: Dike far ahead of spill for later disposal. Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal.
	+ **Small Spills**: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove

residual contamination.

* + Never return spills in original containers for re-use.
	+ Neutralize spill area and washings with soda ash or lime. Collect in a non-combustible container for prompt disposal.
	+ J. T. Baker NEUTRASORB® acid neutralizers are recommended for spills of this product.

**B:Base**

* + Use proper PPE.
	+ Ventilate area.
	+ Neutralize with dilute acid such as HCl if possible.
	+ Absorb with cat litter or vermiculite.
	+ Vacuum or sweep up material and place into suitable disposal container.
	+ Do not breathe dust.
	+ Do not get water on spilled substances.

**M: Mercury**

* + Spills: Pick up and place in a suitable container for reclamation or disposal in a method that does not

generate dust. Sprinkle area with sulfur or calcium polysulfide to suppress mercury. Use Mercury Spill Kit if need be.

**F: Formalin/Formaldehyde**

* + Ventilate area of leak or spill. Remove all sources of ignition.
* Wear appropriate personal protective equipment.
* Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible.
* Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert

material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container.

* Do not use combustible materials, such as sawdust.

**PI:Potassium Iodate**

* Avoid Contact with combustibles (wood, paper, clothing …).
* Keep substance damp with water spray.
* Vacuum or sweep up material and place into suitable disposable container (plastic bag).

**ST: Sodium Thiosulfate**

* Ventilate area of leak or spill.
* Wear protective gloves and clean body-covering
* Use chemical safety goggles. Maintain eye wash fountain and quick-drench facilities in work area.
* Recover liquid or particulate in 5 gallon bucket. Absorb with a kitty litter and place in disposable bag. Do not use combustible materials, such as sawdust to absorb.

**W: Water**

* Absorb the liquid and wash with water
* Wear PPE

**E: Ethanol**

* Eliminate all ignition sources
* Wear PPE

### Chemical Hygiene Plan

Previous sections of the Project Instructions include a list of hazardous materials by name and anticipated quantity. Chemicals will be transported, stored and used in a manner that will avoid any spills and adequate containment, absorbents and cleanup materials will be available in the event of a chemical spill.

The scientific chemicals to be used for this project are: (1) ethyl alcohol (100%) and (2) formaldehyde (37%). Other chemicals brought aboard are consumer products in consumer quantities. Dilutions of the scientific chemicals will be used to preserve in faunal organisms collected with benthic grab samplers, as described in the Operations section of these Project Instructions. Use of these chemicals and the specified dilutions will only occur in exterior locations on the ship away from air intakes. Scientific chemicals shall not be disposed over the side.

Standard Operating Procedures and Information Sheets are provided here for the scientific chemicals. Included are details concerning personal protective equipment, work area precautions, special handling and storage requirements, spill and accident procedures/first aid, waste disposal and other pertinent information. Both small and large spills are of particular concern. In both cases, the spill response isintended to first contain the spill and then neutralize it. This may be easily accomplished for small spills depending on the degree of vessel motion and the prevailing environmental conditions. In all cases, the first responder should quickly evaluate the risks of personal exposure versus the potential impacts of a delayed response to the spill and act accordingly. For example, if the spill is small and it is safe to do so, a neutralizing agent should be rapidly applied to encircle/contain the spill and then cover it. However, a large formaldehyde spill (> 1 L) is extremely hazardous and individuals at risk of exposure should immediately leave the area. The CO or OOD should be notified immediately so that a response team with self-contained breathing apparatus (SCBA) can be deployed to complete the cleanup operation or dispense the hazard with a fire hose directed overboard. The vessel’s course should be adjusted to minimize exposure of personnel to wind-driven vapors and to limit spread of the spill due to vessel motion. The reportable quantity (RQ) of formaldehyde is 1,000 pounds and the RQ for ethyl alcohol is 5,000 pounds which greatly exceed the quantities brought aboard for this project.

**Standard Operating Procedures – Formaldehyde At-Sea**



Chemical Name: 37% Formaldehyde

UN Number: 1198

Hazard Ratings: (on a scale of 0 to 4)

Health (blue): 3 Flammability (red): 2 Reactivity (yellow): 2 Special (white): Personal Protection Gear Needed

\*gloves

\*goggles or face shield Special Handling Instructions

* If a ventilation hood is not available, then pouring of chemical must be done outside. At least two people should be involved with large chemical transfers in case of an emergency.
* Chemical must be stored at temperatures above 15o c to prevent polymerization of paraformaldehyde.

First Aid

* If swallowed, give large amounts of drinking water and induce vomiting.
* If vapors inhaled, get out into fresh air immediately. Give oxygen if breathing is difficult.
* If spilled on skin or splashed in eyes, flush with water for at least 15 minutes.

Spill Cleanup Procedures

**For small spills** (500-1000 mls):

Cover spill quickly with a Fan Pad and spray on Formalex to deactivate and absorb chemical. Let material sit for 10 - 15 minutes. Dispose of materials in plastic bag.

**For large spills** (1000 mls - ?):

Use a combination of Fan Pads and Formalex as quickly as possible to contain spill and deactivate it. Vacate area and try to ventilate room, if possible. Call Bridge immediately.

Deactivation/Disposal Procedures At Sea

\*Formalex is a greenish liquid that is to be used to insure proper chemical deactivation. Formalex should also be used in conjunction with Fan Pads. Place used Fan Pad in plastic bag, seal, and put in bottom of Spill Kit.

\*Fan Pads may be used to absorb small spills alone but these pads work best when used with Formalex to immediately control the vapor layer.

Shipping Procedures and Restrictions

37% formaldehyde cannot be ship by air due to its flammability rating.

All quantities should be over-packed with absorbency material in case the original container is damaged. When shipping by barge or land, labels are not required for quantities under 110 gallons by D.O.T. but the container should have MSDSs and the UN number readily available.

**Standard Operating Procedures – Ethanol At-Sea**

Chemical Name: 100% Alcohol UN Number: 1170

Hazard Ratings: (on a scale of 0 to 4)

Health (blue): 2 Flammability (red): 3 Reactivity (yellow): 1 Special (white): Personal Protection Gear Needed

\*gloves

\*goggles or face shield when pouring Special Handling Instructions

* Keep away from heat, flame, and other potential ignition sources.
* Store in a well ventilated area or in a flammable cabinet. First Aid
* If swallowed, give large amounts of drinking water and induce vomiting.
* If vapors inhaled, get out into fresh air immediately. Give oxygen if breathing is difficult.
* If spilled on skin or splashed in eyes, flush with water for at least 15 minutes. Spill Cleanup Procedures

Absorb ethanol with 3M Sorbent Pads and allow to dry in a well ventilated area away from ignition source.

Deactivation/Disposal Procedures At Sea

Use 3M Sorbent Pads to absorb the ethanol. Put used pads outside to dry (secure from blowing overboard and exposure to flame). Once dry, the pads may be reused or burned.

Shipping Procedures and Restrictions

Due to the flammability rating of 95% ethanol, this chemical cannot be shipped by air. Transportation by barge or land vehicle will require the ethanol container to be over-packed with absorbent materials such as clumping kitty litter or shredded paper. Include MSDSs and the UN number with the shipment for reference in the event of a spill.